



## *Fossil fuel power generation plant replaces an Emerson DCS-based control system and Westinghouse distributed I/O with a PLC and HMI solution to improve performance of its Coal Delivery Conveyor System.*

### SPECIFICATIONS

#### Technologies

##### Software

- RSLogix™ 5000
- RSNetWorx™
- RSLinx™
- RSView32™

##### Networks

- Ethernet
- ControlNet™
- DH+

##### Hardware

- ControlLogix PLC
- Flex Remote I/O
- Point I/O
- Phoenix Contact Wireless I/O
- Dell Personal Computers
- ControlNet™ RG6 Coax to Fiber Converters
- Ethernet to STP to Fiber Converters

#### Objectives

##### Production Benefits

- Decrease coal delivery system downtime
- Increase per shift coal delivery tonnage
- Improve visibility of the coal delivery system's utilization
- Improve fault diagnostic capabilities
- A control system that is expandable to additional equipment and/or features

A fossil fuel power generation plant in the southeast United States has four coal-fired units and produces approximately 7.4 gigawatt-hours of electricity a year. The plant consumes roughly 12,300 tons of coal each day in support of the seven day a week, 24 hour per day operation schedule.

The principal means of delivering coal to the plant is by river barge. Once unloaded from a barge, the plant's Coal Delivery Conveyor System conveys the coal to the coal bunker. The total conveyor distance traversed from the river to the bunker is approximately one mile.

The existing control system on the Coal Delivery Conveyor System was causing the plant problems. The majority of the control system consisted of electrical hardwire controls and an antiquated DCS system. Troubleshooting was difficult and personnel spent a great deal of time assessing downtime issues through trial and error. Existing alarms were cascading which made identifying a root cause nearly impossible. Numerous nuisance conveyor trips resulted in significant downtime and added undue stress on the conveyor equipment. A number of items such as scales and coal diverters had not worked properly for some time. In addition, over the years numerous modifications had been made to the system without appropriate updates made to the documentation. In general, the control system architecture was outdated and inflexible, handcuffing the plant when modifications or expansion to the Coal Delivery Conveyor System was required.

PREMIER worked with the customer's engineering group to upgrade the control system. The basis of the project was to replace the DCS system with a ControlLogix PLC-based solution, while retaining use of the Barge Unloader System which ran on a PLC-5.

The previous HMI system was replaced with RSView. This new operator controls interface was enhanced and much improved troubleshooting

capabilities were put in place. In addition, PID control was implemented on all VFD equipped Reclaim Vibratory Coal Feeders. The old wireless remote I/O system in use by the Tripper cars was also replaced. The controls network was modified to account for the new controls hardware and for the removal of the Coal Tower Building entirely from the control system.

Installation of the new system was a coordinated effort between PREMIER, the customer's engineering team and the electrical subcontractor. Managed by PREMIER, all installation activities and the subsequent timing and execution of "system tie-in" were critical. During the allotted shutdown periods, the system was changed over and online with minimal issues and no process interruptions; a crucial measure of success due to the plant's operation schedule and requirement to meet electricity production demands.

To complete the project, all documentation was updated to accurately reflect the new Coal Delivery Conveyor control system.

Since implementation, customer feedback has indicated a 2% - 3% increase in coal delivery yield. Maintenance personnel have reported the new system allows for easy troubleshooting and quick and accurate identification of issues. Production Management has observed that the increased HMI capabilities have improved their control of the coal delivery system and allows them to accurately quantify the amount of coal that is delivered.

